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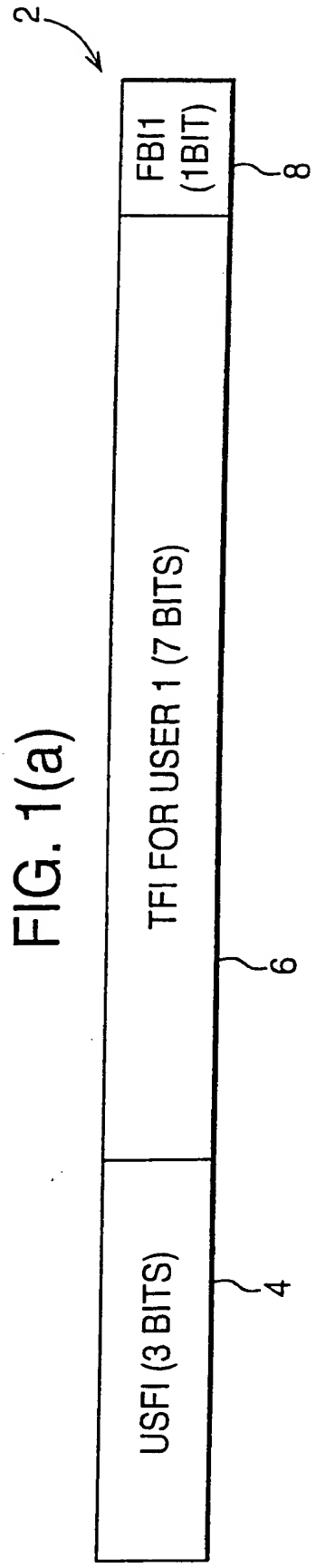

FIG. 1(a)

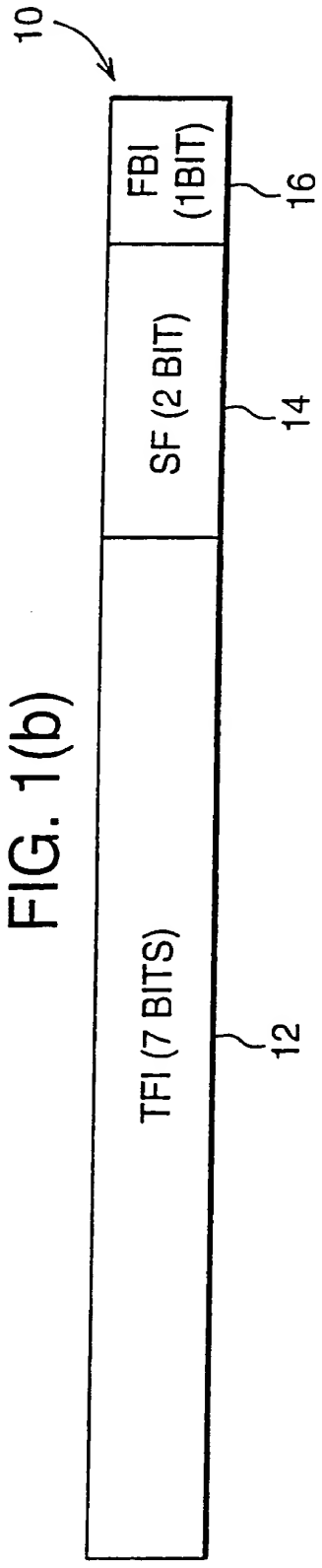

FIG. 1(b)

FIG. 2(a)

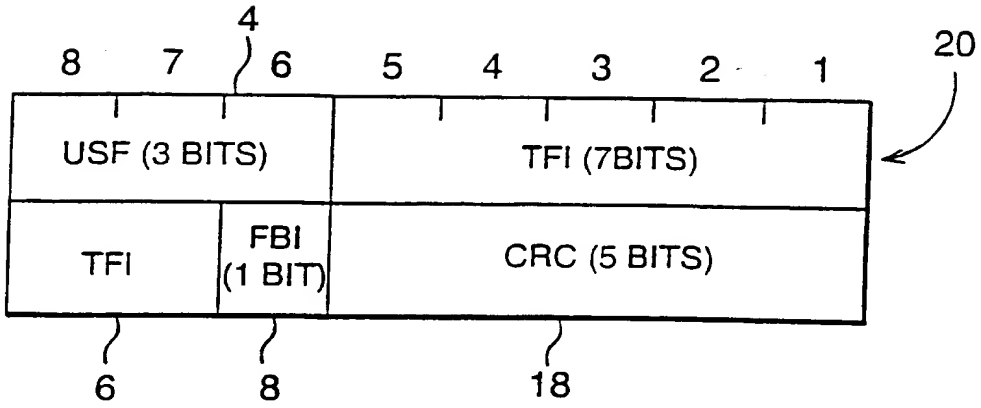

FIG. 2(b)

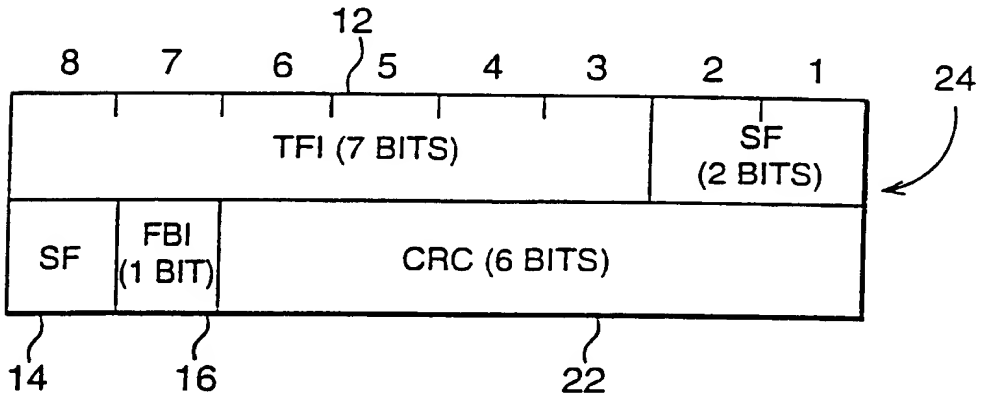

FIG. 3(a)

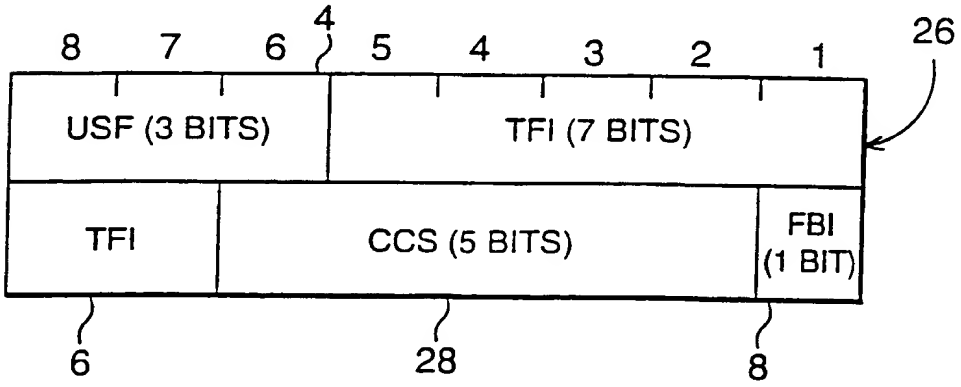

FIG. 3(b)

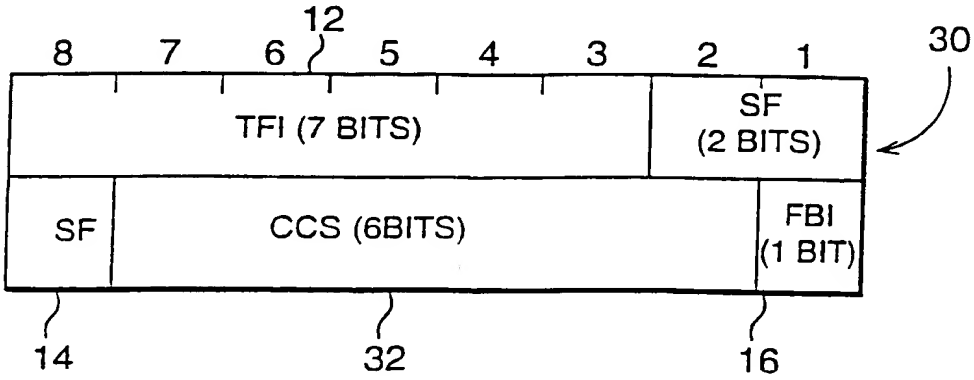

FIG. 4(a)

34 C/I (dB)	36 DROPPED HEADERS WITHOUT ERROR DETECTION	38 DROPPED HEADERS WITH ERROR DETECTION	40 IMPROVEMENT (%)
6	1429	1281	10.36
7	1028	884	14.01
8	700	591	15.57
9	454	401	11.67
10	278	243	12.59
11	180	140	22.22
12	101	87	13.86
13	59	47	20.34

FIG. 4(b)

34 C/I (dB)	36 DROPPED HEADERS WITHOUT ERROR DETECTION	38 DROPPED HEADERS WITH ERROR DETECTION	40 IMPROVEMENT (%)
6	1453	1258	13.42
7	1087	930	14.44
8	715	608	14.96
9	498	402	19.27
10	285	230	19.29
11	199	157	21.10
12	98	74	24.49
13	49	39	20.41

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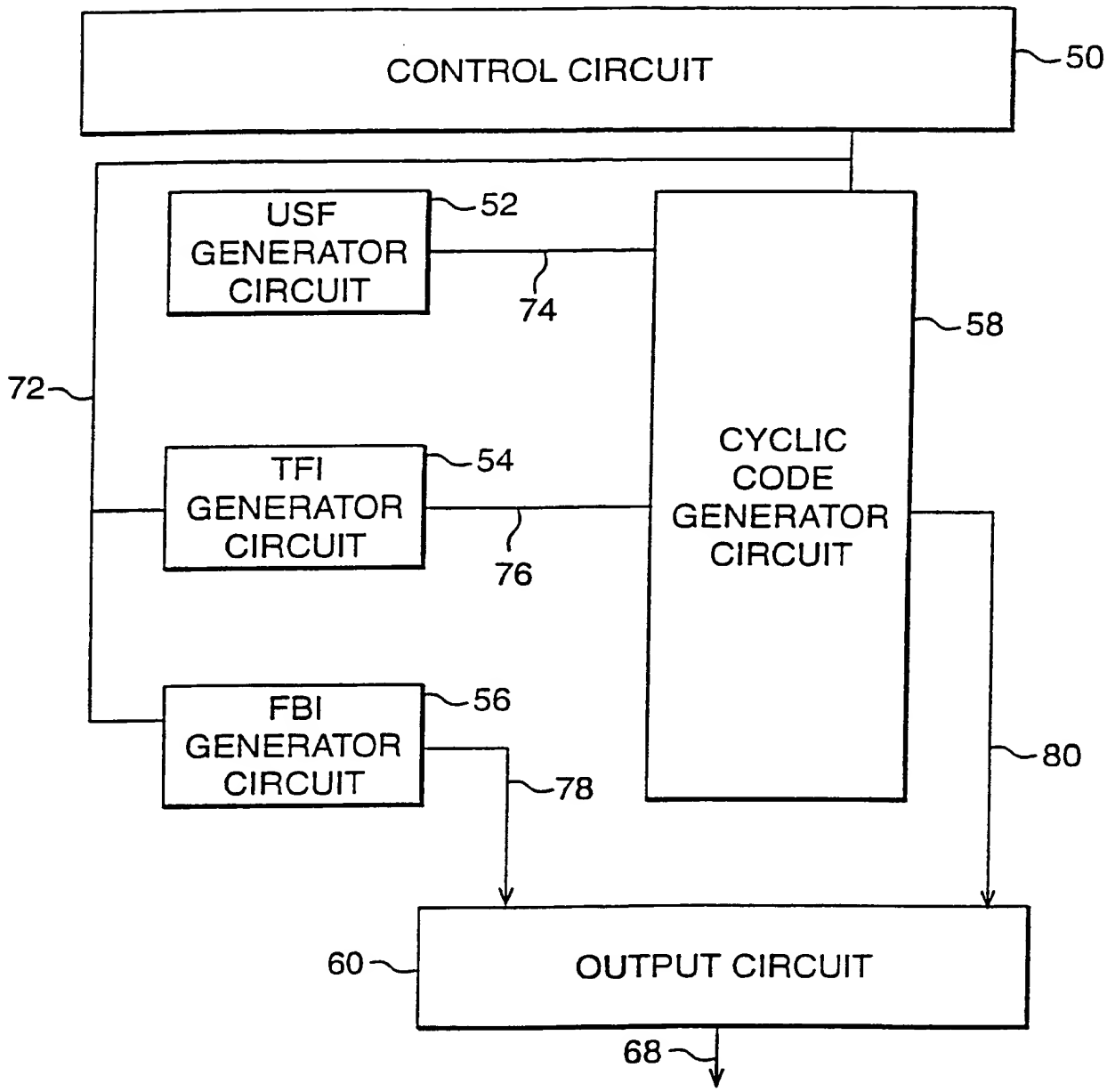
FIG. 5


CONTROL CIRCUIT
50
USF GENERATOR CIRCUIT
52
74
58
72
TFI GENERATOR CIRCUIT
54
76
CYCLIC CODE GENERATOR CIRCUIT
FBI GENERATOR CIRCUIT
56
78
80
60
OUTPUT CIRCUIT
68

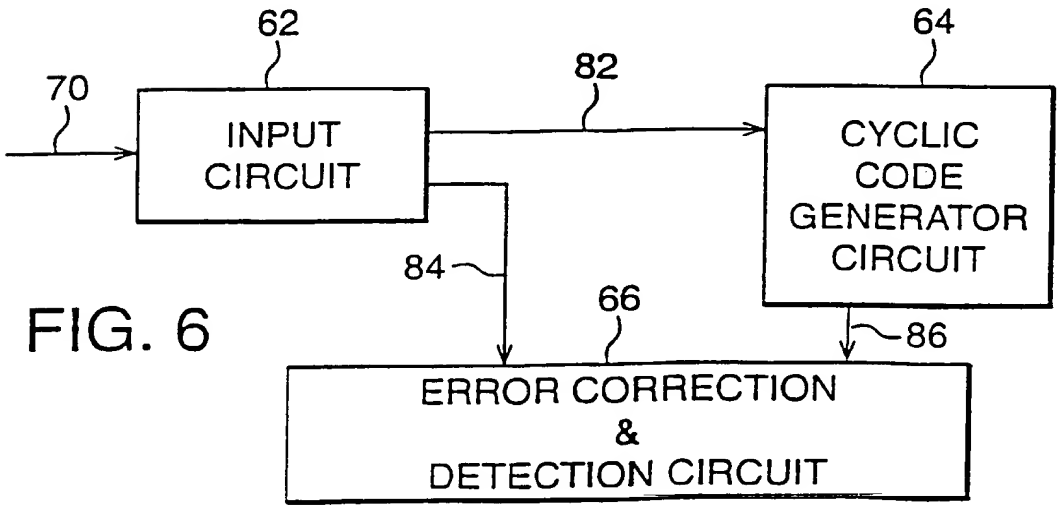

62
64
70
82
INPUT CIRCUIT
CYCLIC CODE GENERATOR CIRCUIT
84
66
86
ERROR CORRECTION & DETECTION CIRCUIT

FIG. 6

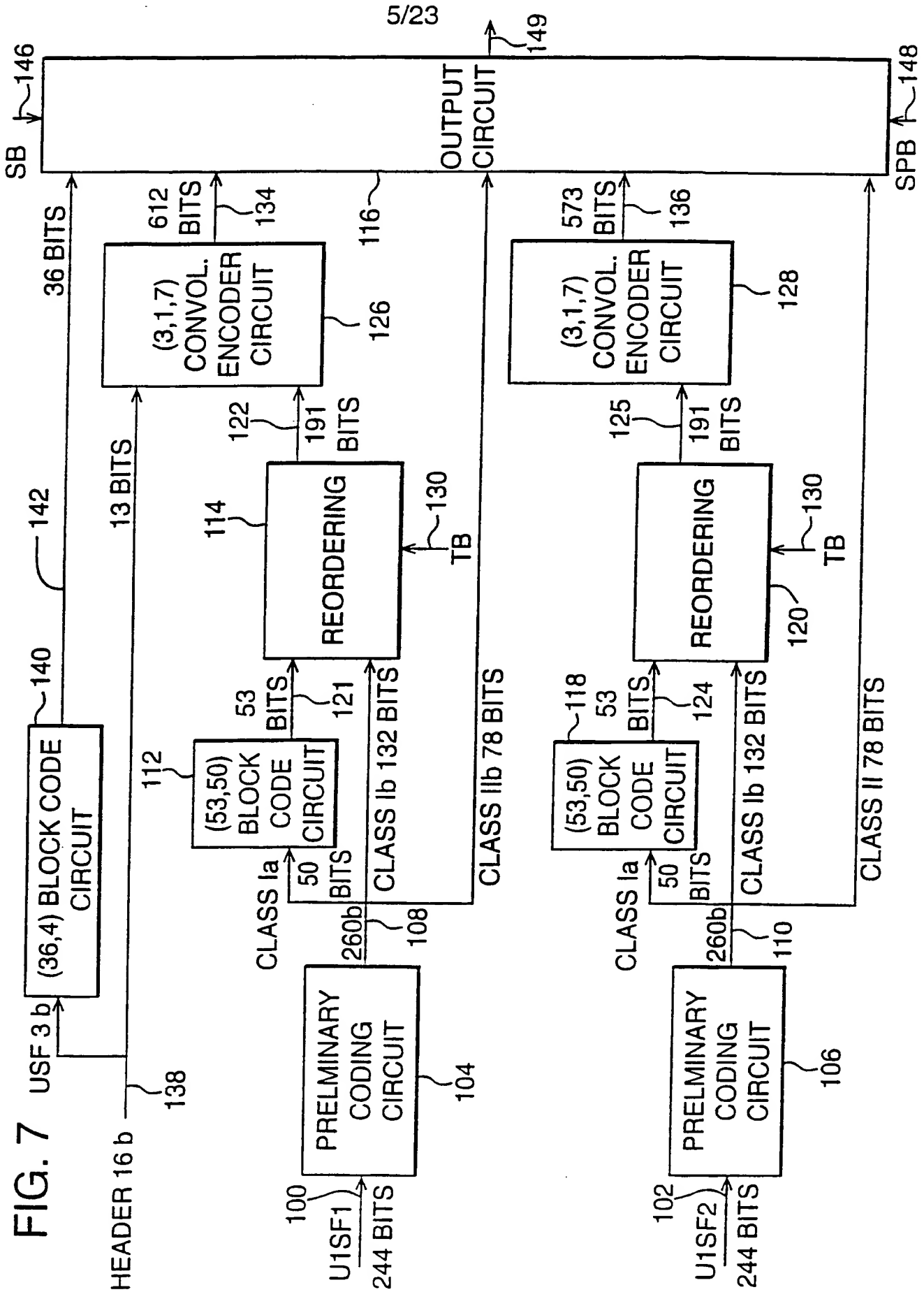

SB
146
OUTPUT CIRCUIT
149
SPB
148
612 BITS
134
573 BITS
136
116
36 BITS
(3,1,7) CONVOL. ENCODER CIRCUIT
126
(3,1,7) CONVOL. ENCODER CIRCUIT
128
122
191 BITS
125
191 BITS
114
REORDERING
130
TB
REORDERING
130
TB
120
142
13 BITS
140
(36,4) BLOCK CODE CIRCUIT
112
(53,50) BLOCK CODE CIRCUIT
53 BITS
121
118
53 BITS
124
CLASS Ia
50 BITS
CLASS Ib 132 BITS
CLASS IIb 78 BITS
CLASS Ia
50 BITS
CLASS Ib 132 BITS
CLASS II 78 BITS
260b
108
260b
110
USF 3 b
138
HEADER 16 b
PRELMINARY CODING CIRCUIT
104
PRELMINARY CODING CIRCUIT
106
100
U1SF1
244 BITS
102
U1SF2
244 BITS

FIG. 7

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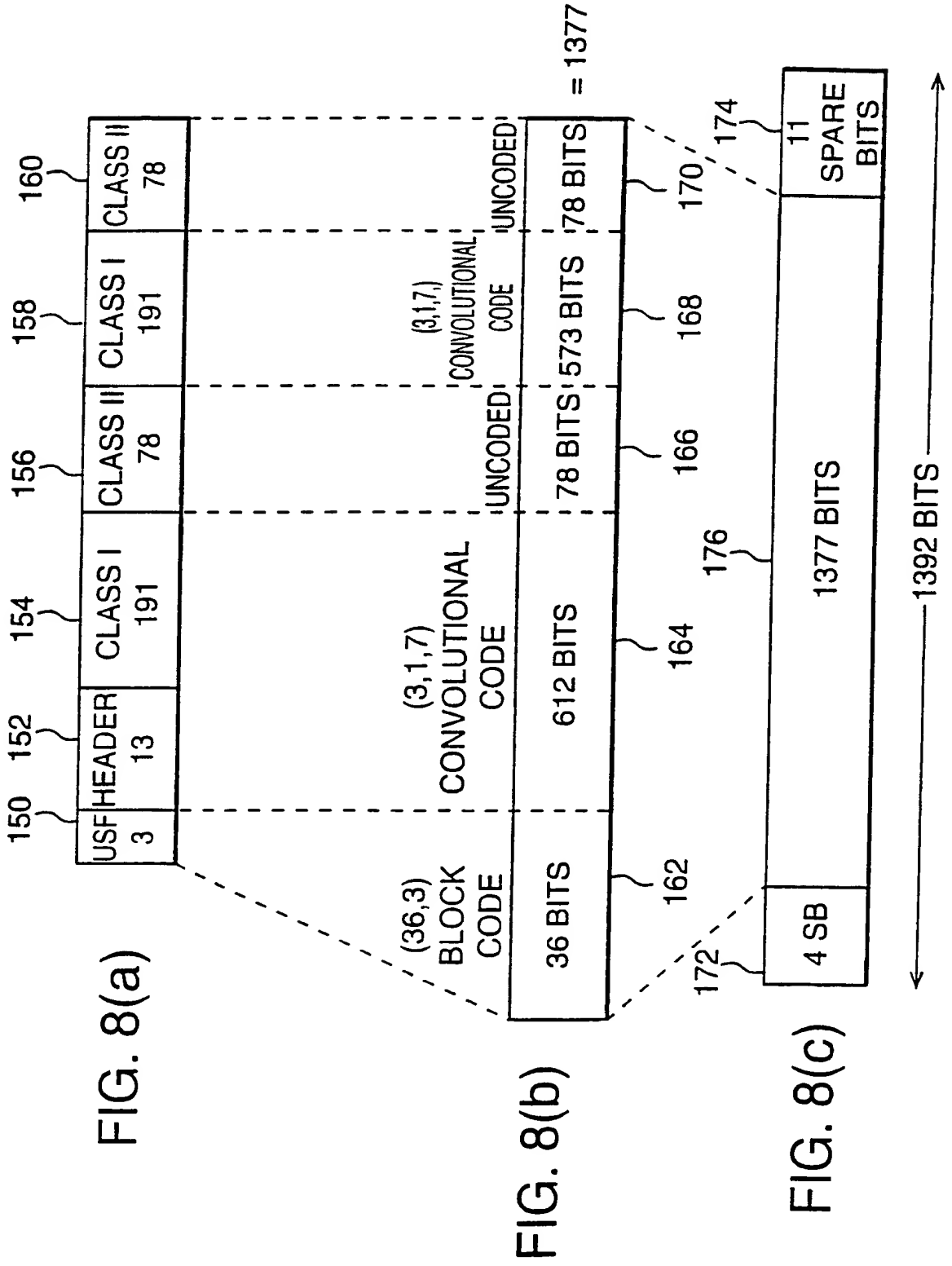

FIG. 8(a)

FIG. 8(b)

FIG. 8(c)

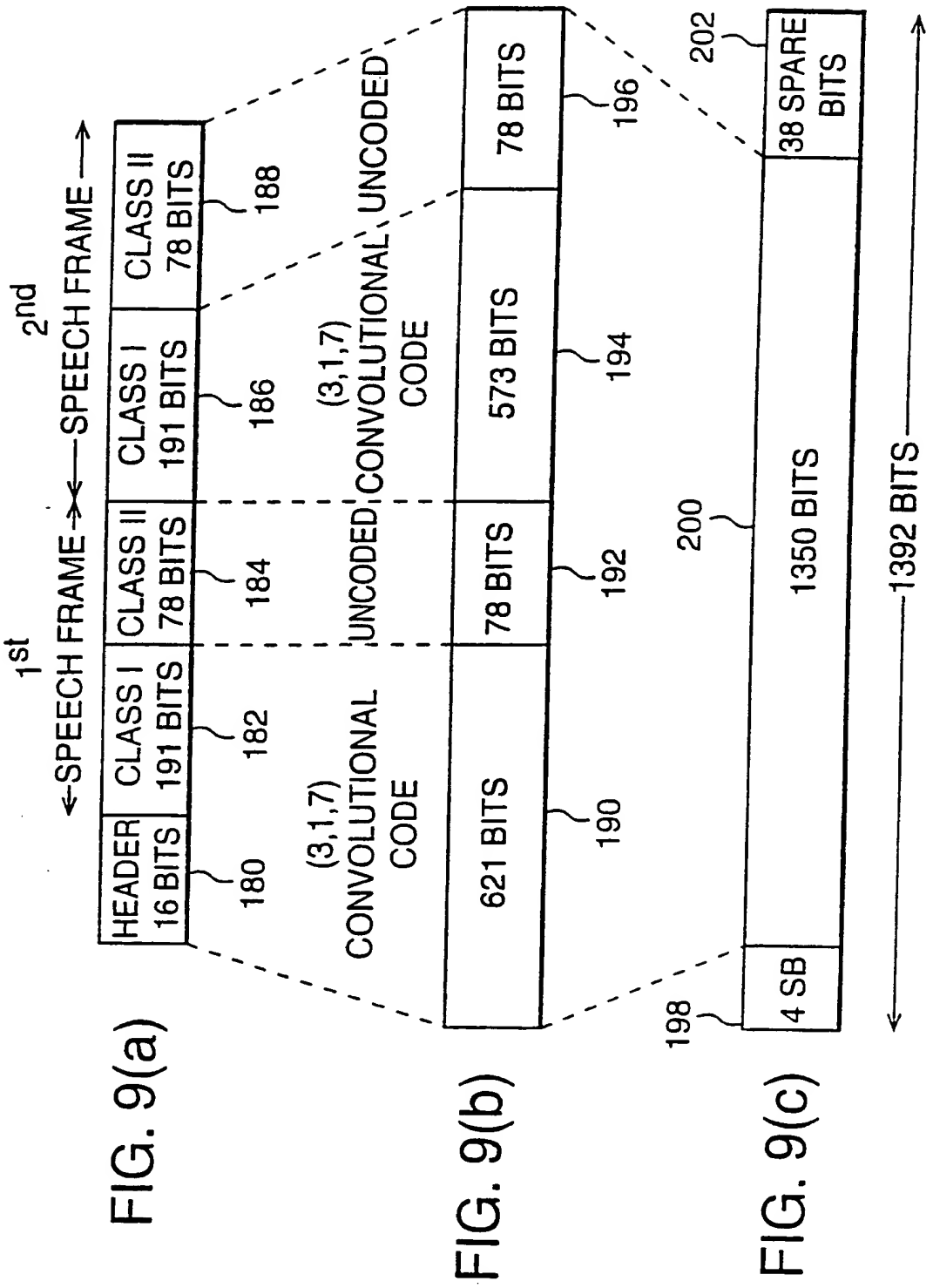

FIG. 9(a)

FIG. 9(b)

FIG. 9(c)

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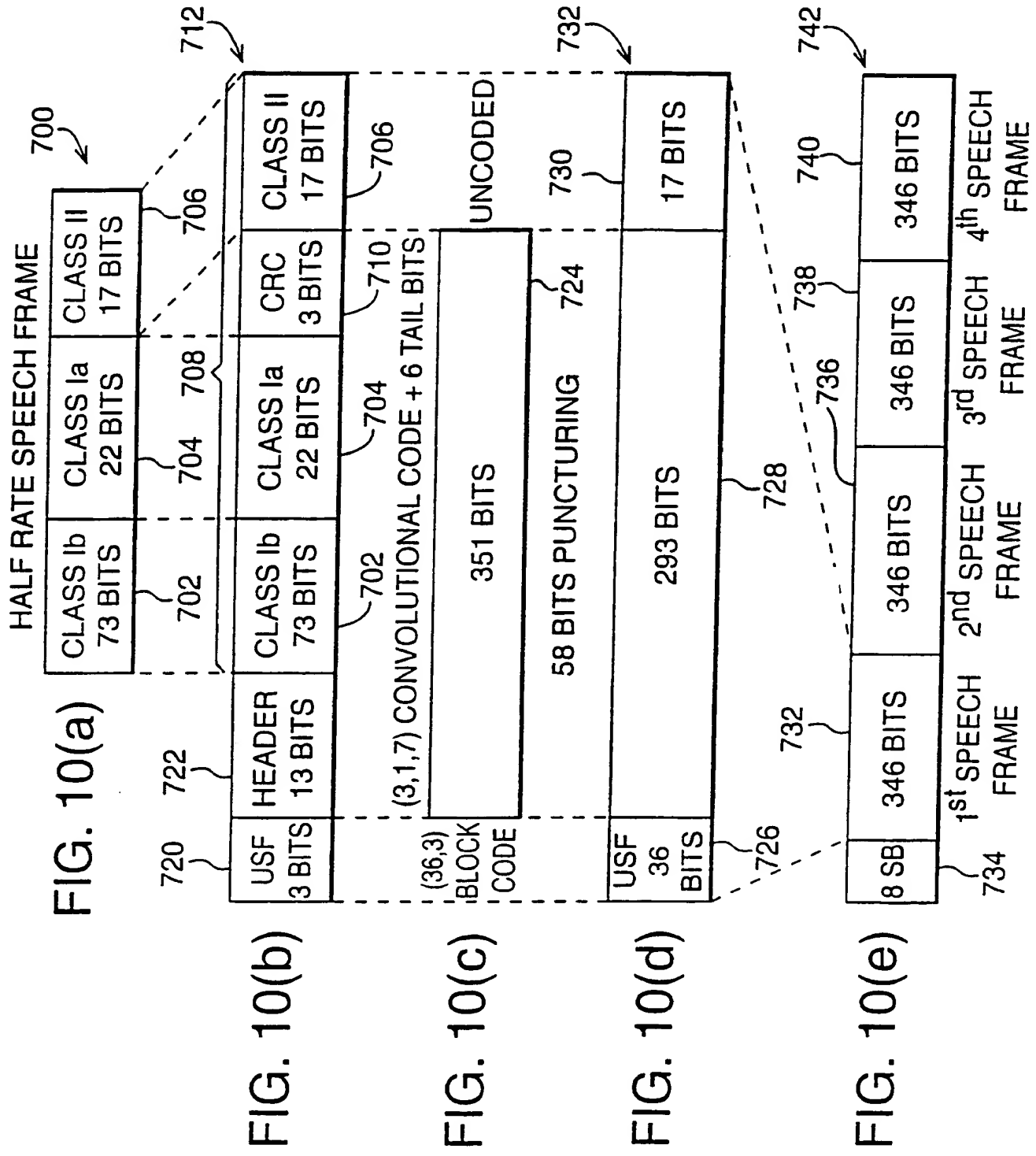

HALF RATE SPEECH FRAME
700
CLASS Ib 73 BITS
CLASS Ia 22 BITS
CLASS II 17 BITS
702
704
706
708
712
FIG. 10(a)
USF 3 BITS
HEADER 13 BITS
CLASS Ib 73 BITS
CLASS Ia 22 BITS
CRC 3 BITS
CLASS II 17 BITS
720
722
(3,1,7) CONVOLUTIONAL CODE + 6 TAIL BITS
UNCODED
(36,3) BLOCK CODE
351 BITS
710
724
FIG. 10(b)
58 BITS PUNCTURING
730
732
FIG. 10(c)
USF 36 BITS
293 BITS
17 BITS
726
728
FIG. 10(d)
742
740
738
736
732
8 SB
346 BITS
346 BITS
346 BITS
346 BITS
734
1st SPEECH FRAME
2nd SPEECH FRAME
3rd SPEECH FRAME
4th SPEECH FRAME
FIG. 10(e)

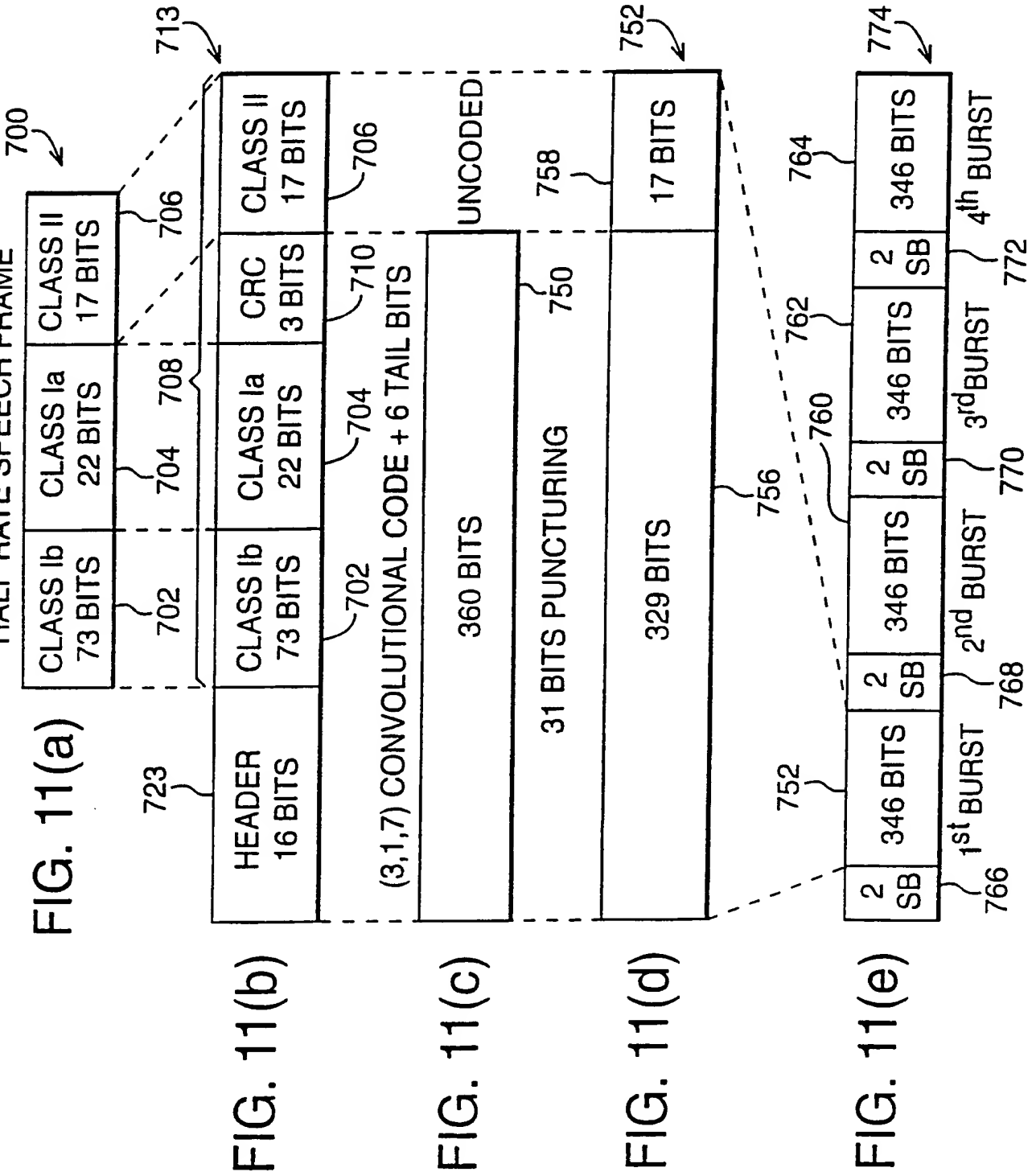


FIG. 11(a)

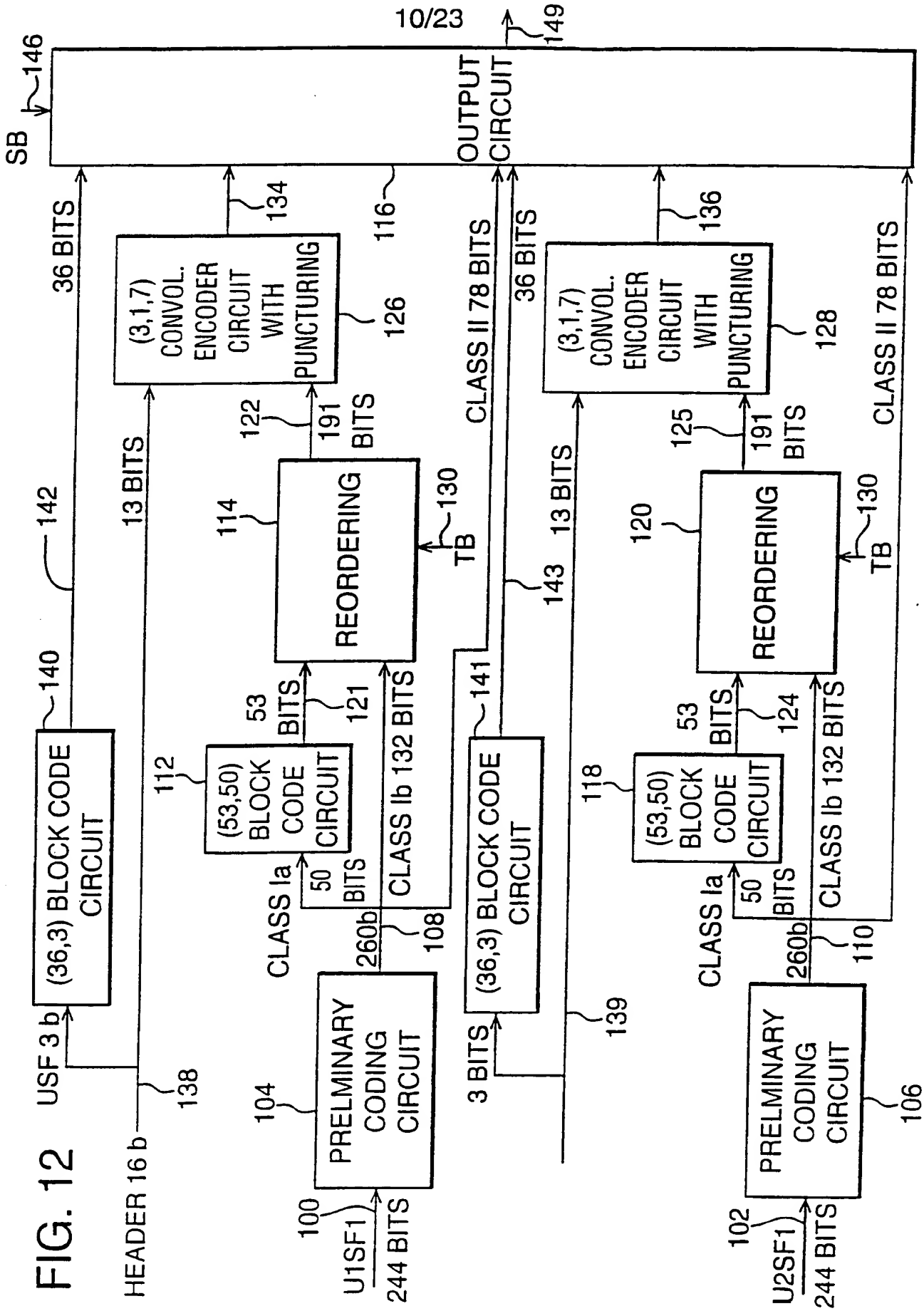
FIG. 11(b)

FIG. 11(c)

FIG. 11(d)

FIG. 11(e)

FIG. 12


SB
146
OUTPUT CIRCUIT
149
116
36 BITS
142
13 BITS
(3,1,7) CONVOL. ENCODER CIRCUIT WITH PUNCTURING
134
126
122
191 BITS
114
REORDERING
130
TB
CLASS II 78 BITS
36 BITS
(3,1,7) CONVOL. ENCODER CIRCUIT WITH PUNCTURING
136
128
125
191 BITS
120
REORDERING
130
TB
CLASS II 78 BITS
140
(36,3) BLOCK CODE CIRCUIT
USF 3 b
138
HEADER 16 b
53 BITS
121
112
(53,50) BLOCK CODE CIRCUIT
CLASS Ia
50 BITS
CLASS Ib 132 BITS
260b
108
141
(36,3) BLOCK CODE CIRCUIT
3 BITS
139
143
13 BITS
53 BITS
124
118
(53,50) BLOCK CODE CIRCUIT
CLASS Ia
50 BITS
CLASS Ib 132 BITS
260b
110
104
PRELMINARY CODING CIRCUIT
100
U1SF1
244 BITS
106
PRELMINARY CODING CIRCUIT
102
U2SF1
244 BITS

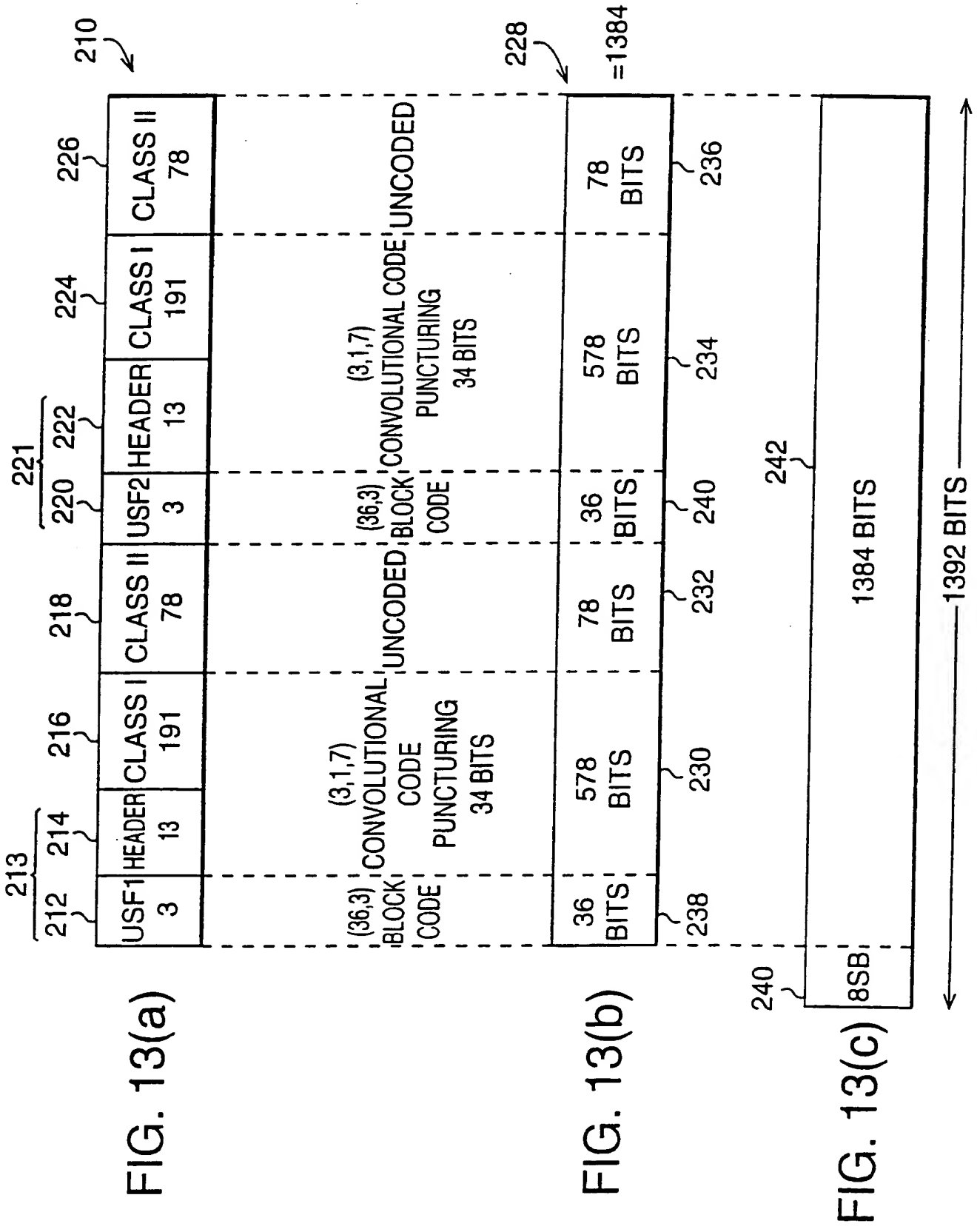


FIG. 13(a)

FIG. 13(b)

FIG. 13(c)

FIG. 14(a)

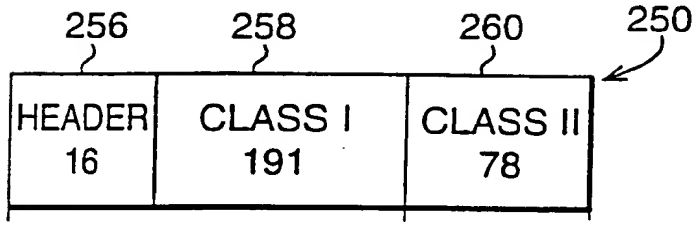


FIG. 14(b)

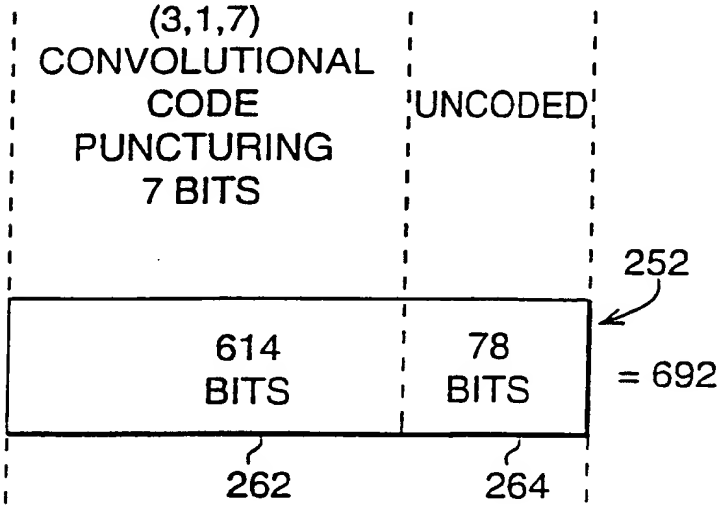
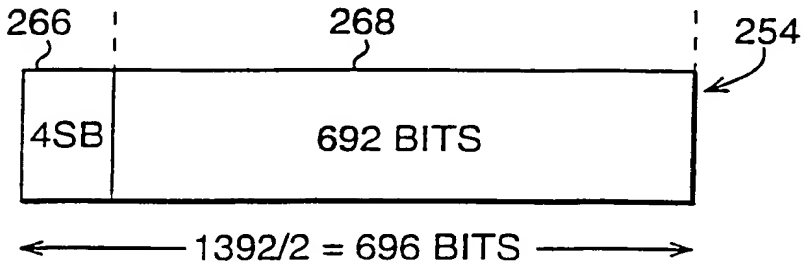


FIG. 14(c)



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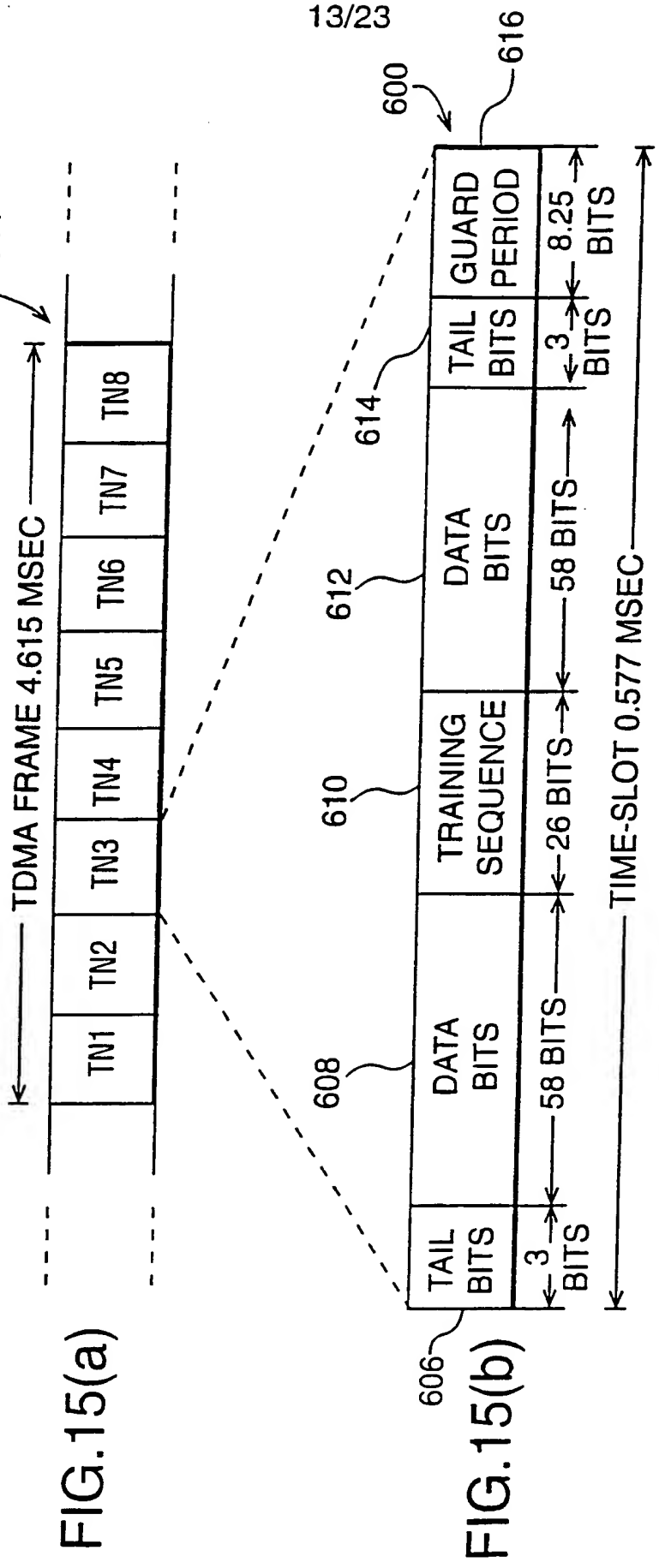


FIG.15(a)

FIG.15(b)

FIG.15(c)

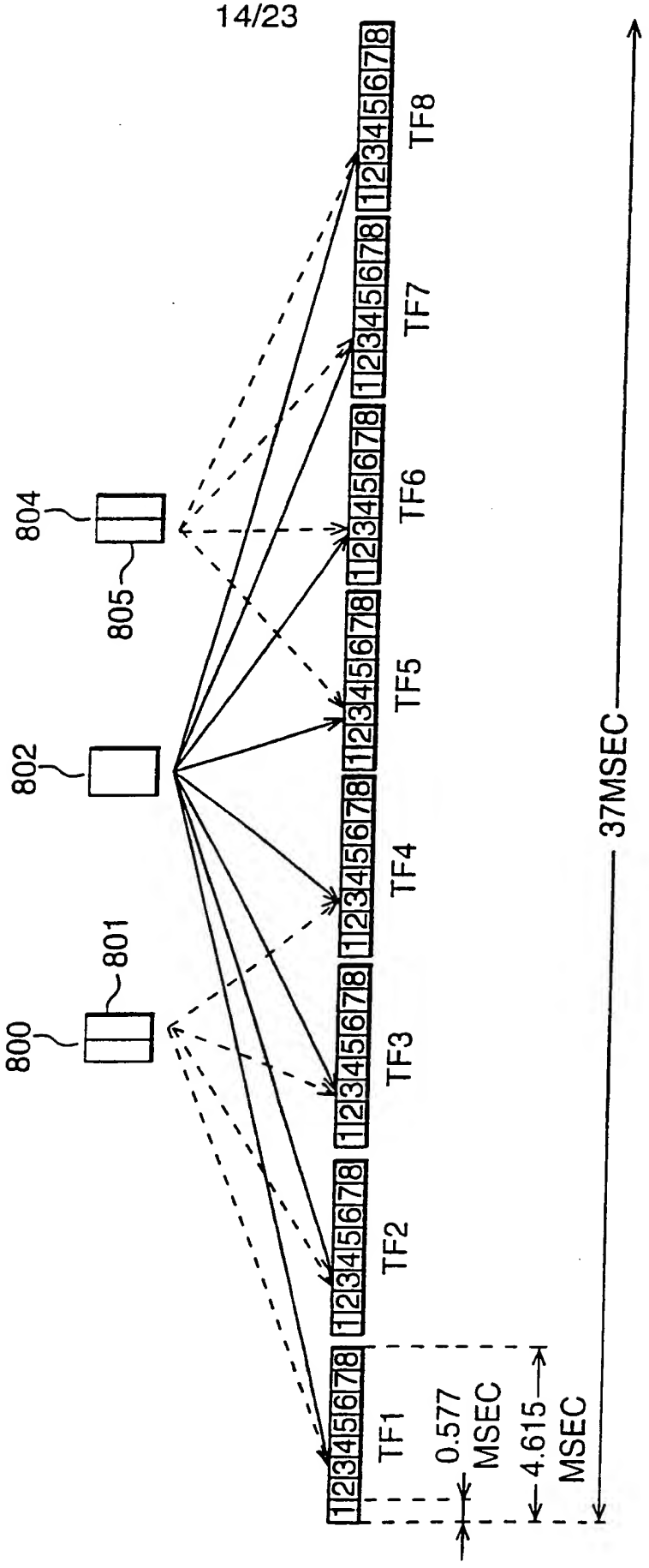

800
801
802
804
805
TF1
TF2
TF3
TF4
TF5
TF6
TF7
TF8
0.577 MSEC
4.615 MSEC
37MSEC

FIG.15(d)

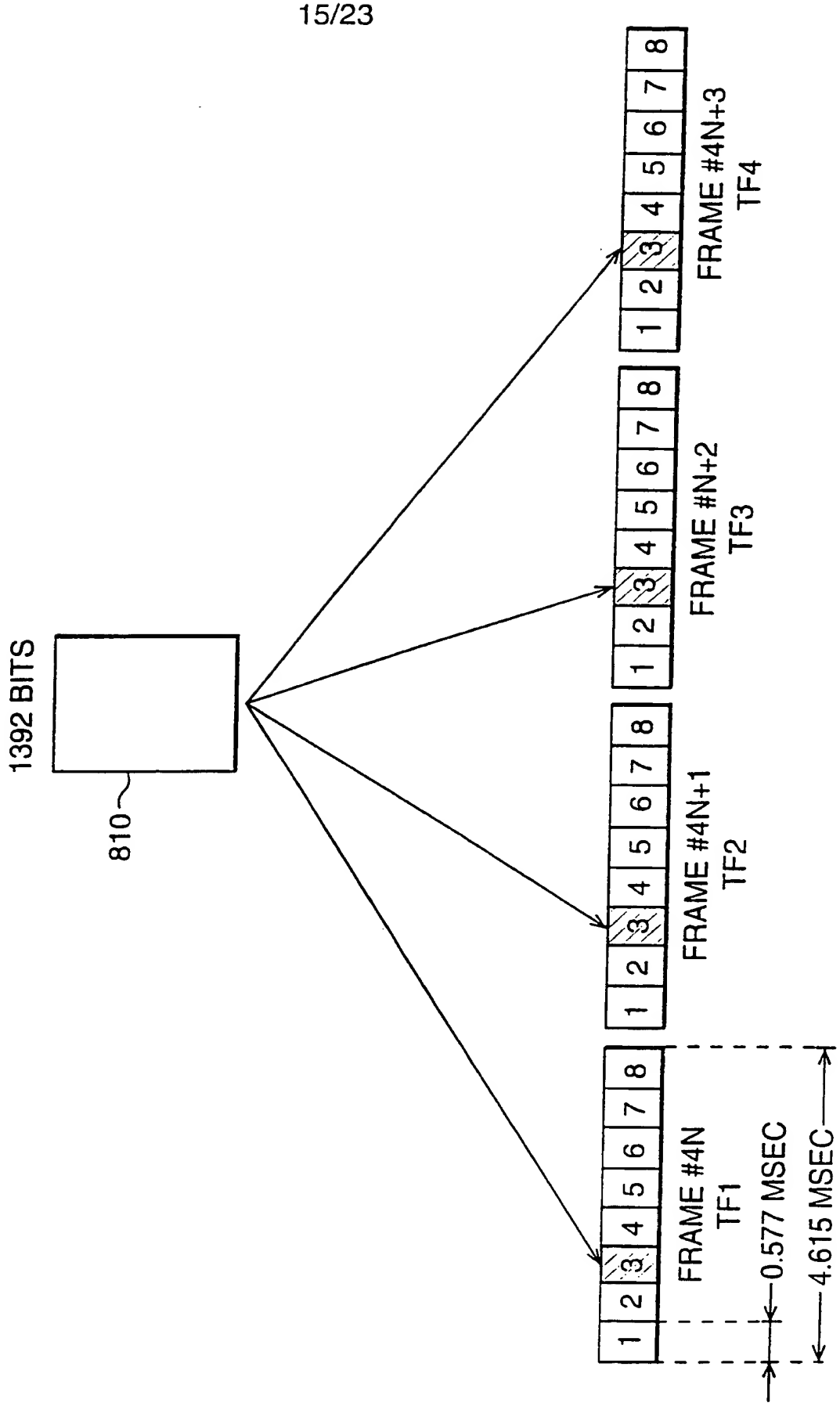

1392 BITS
810
FRAME #4N
TF1
FRAME #4N+1
TF2
FRAME #N+2
TF3
FRAME #4N+3
TF4
0.577 MSEC
4.615 MSEC

FIG.16

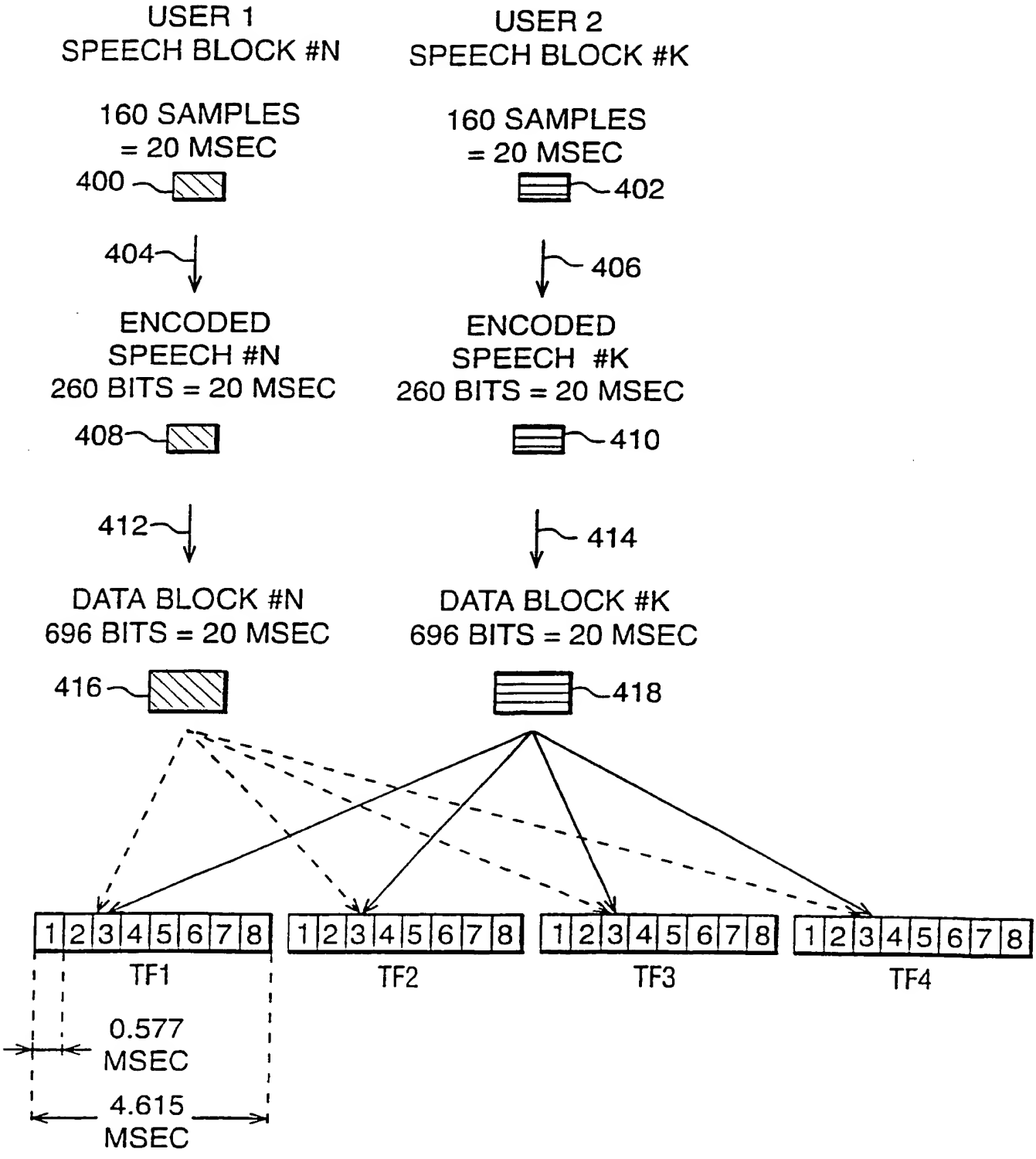

USER 1
SPEECH BLOCK #N
160 SAMPLES
= 20 MSEC
400
404
ENCODED
SPEECH #N
260 BITS = 20 MSEC
408
412
DATA BLOCK #N
696 BITS = 20 MSEC
416
USER 2
SPEECH BLOCK #K
160 SAMPLES
= 20 MSEC
402
406
ENCODED
SPEECH #K
260 BITS = 20 MSEC
410
414
DATA BLOCK #K
696 BITS = 20 MSEC
418
1 2 3 4 5 6 7 8
TF1
TF2
TF3
TF4
0.577
MSEC
4.615
MSEC

FIG.17

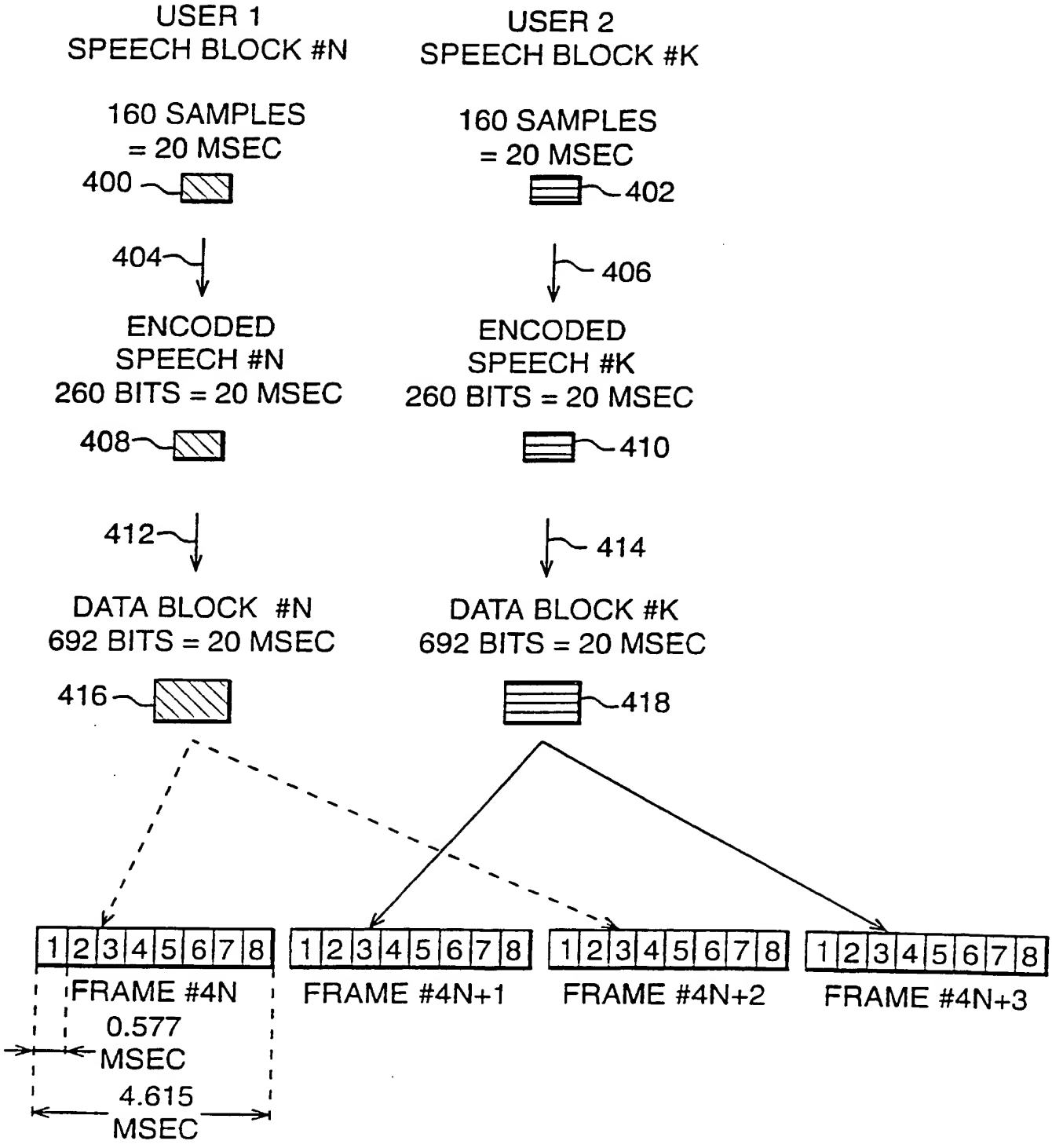
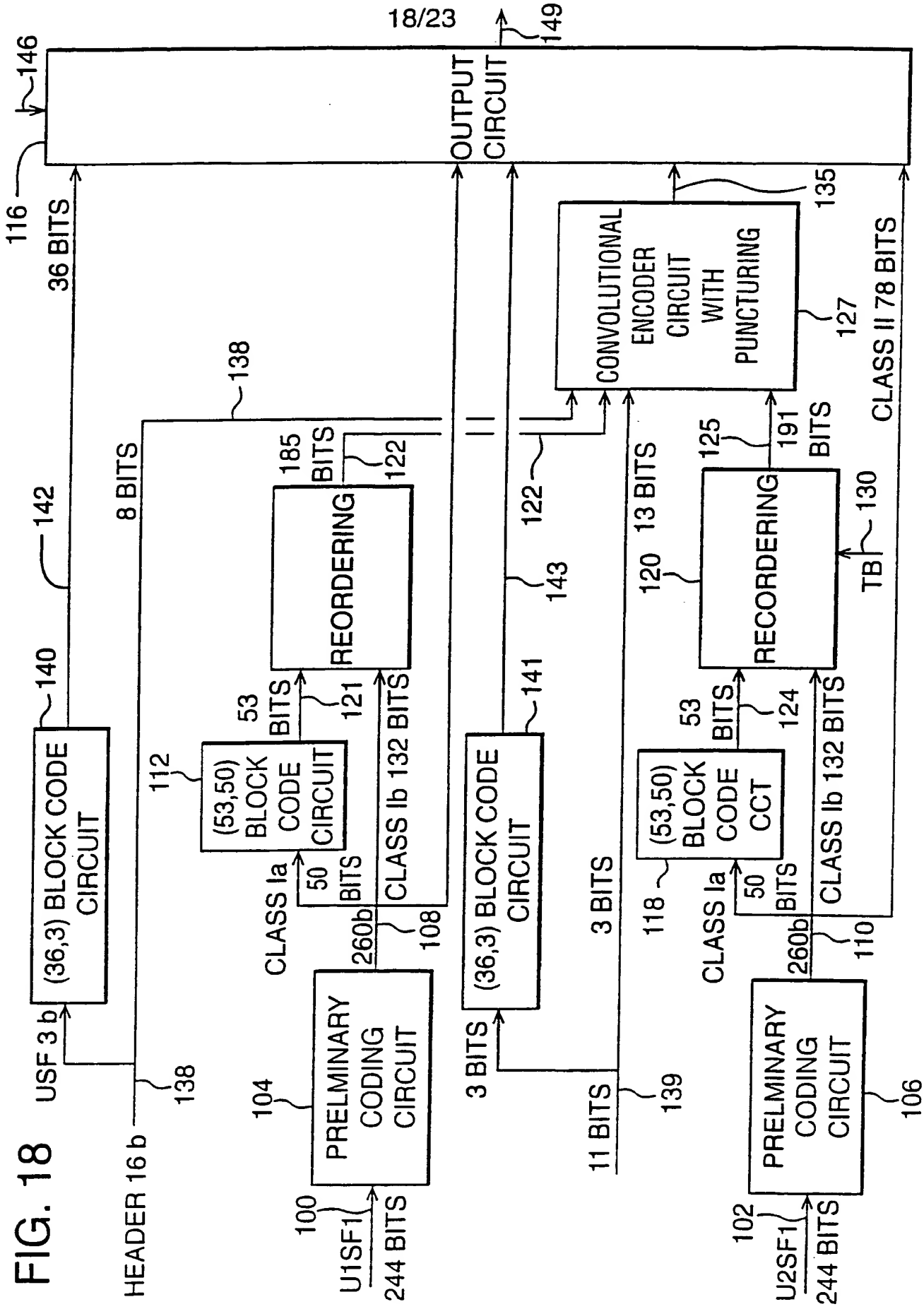

USER 1
SPEECH BLOCK #N
160 SAMPLES
= 20 MSEC
400
404
ENCODED
SPEECH #N
260 BITS = 20 MSEC
408
412
DATA BLOCK #N
692 BITS = 20 MSEC
416
USER 2
SPEECH BLOCK #K
160 SAMPLES
= 20 MSEC
402
406
ENCODED
SPEECH #K
260 BITS = 20 MSEC
410
414
DATA BLOCK #K
692 BITS = 20 MSEC
418
1 2 3 4 5 6 7 8
FRAME #4N
0.577
MSEC
4.615
MSEC
FRAME #4N+1
FRAME #4N+2
FRAME #4N+3

FIG. 18


OUTPUT CIRCUIT
149
146
116
36 BITS
USF 3 b
(36,3) BLOCK CODE CIRCUIT
140
142
HEADER 16 b
138
8 BITS
138
112
(53,50) BLOCK CODE CIRCUIT
53 BITS
121
REORDERING
185 BITS
122
CLASS Ia 50 BITS
CLASS Ib 132 BITS
260b
108
104
PRELIMINARY CODING CIRCUIT
100
U1SF1
244 BITS
3 BITS
(36,3) BLOCK CODE CIRCUIT
141
143
122
CONVOLUTIONAL ENCODER CIRCUIT WITH PUNCTURING
135
127
13 BITS
3 BITS
11 BITS
139
120
RECORDERING
125
191 BITS
130
TB
CLASS II 78 BITS
(53,50) BLOCK CODE CCT
53 BITS
124
118
CLASS Ia 50 BITS
CLASS Ib 132 BITS
260b
110
PRELIMINARY CODING CIRCUIT
106
102
U2SF1
244 BITS

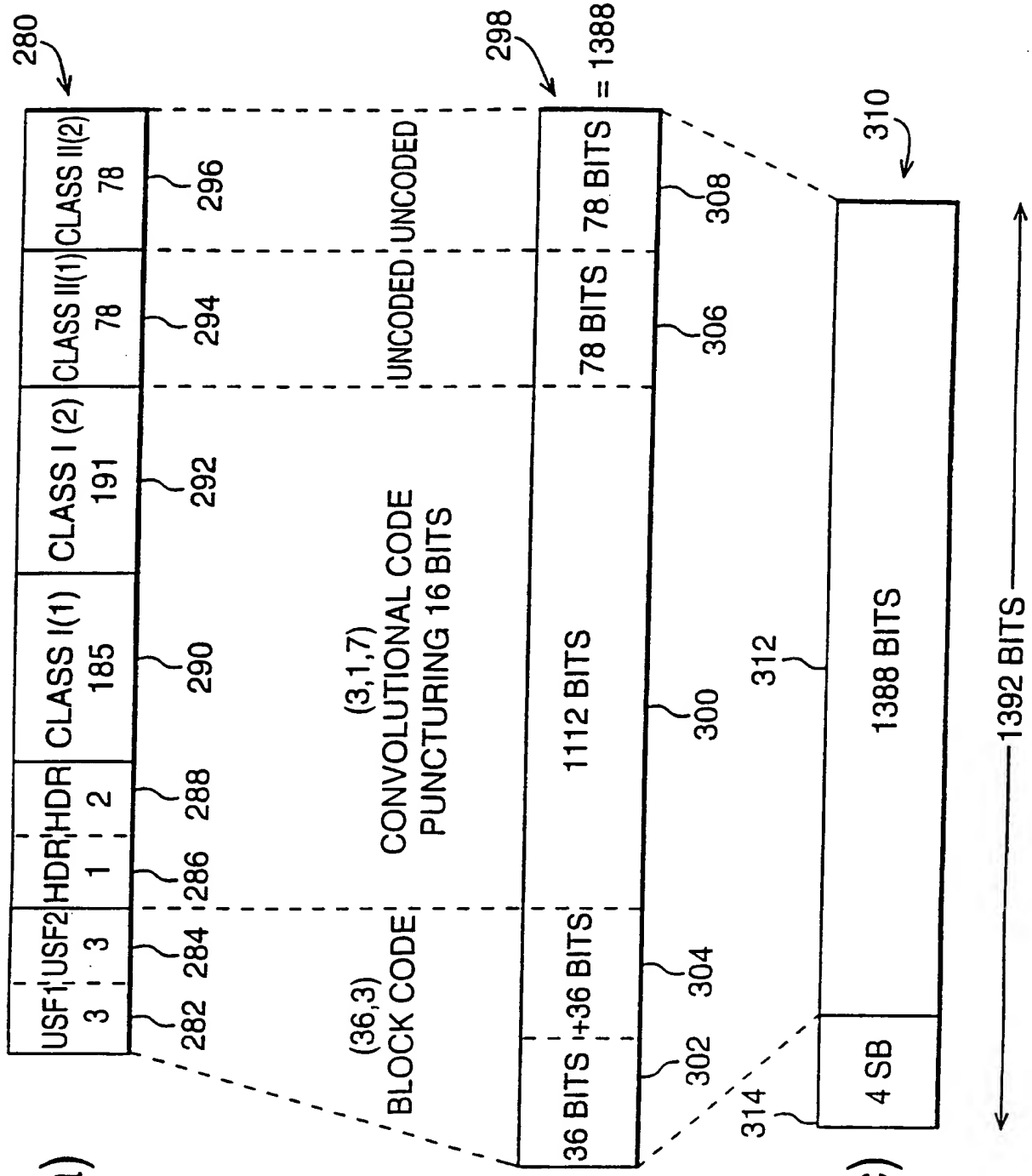
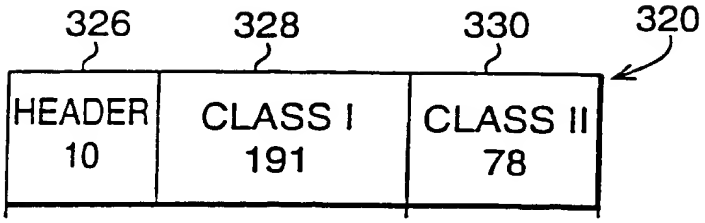


FIG. 19(a)

FIG. 19(b)

FIG. 19(c)

FIG. 20(a)



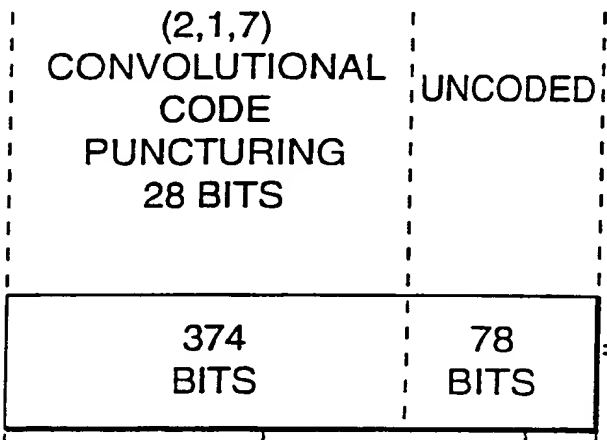
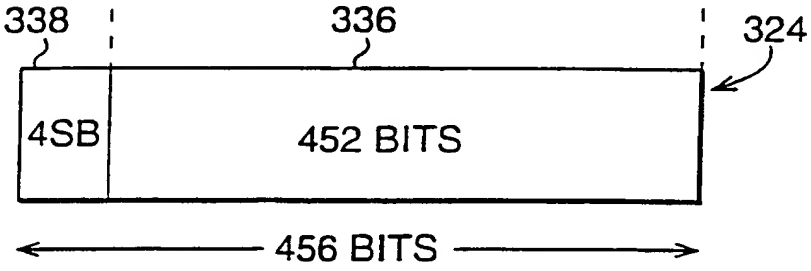


FIG. 20(b)

FIG. 20(c)



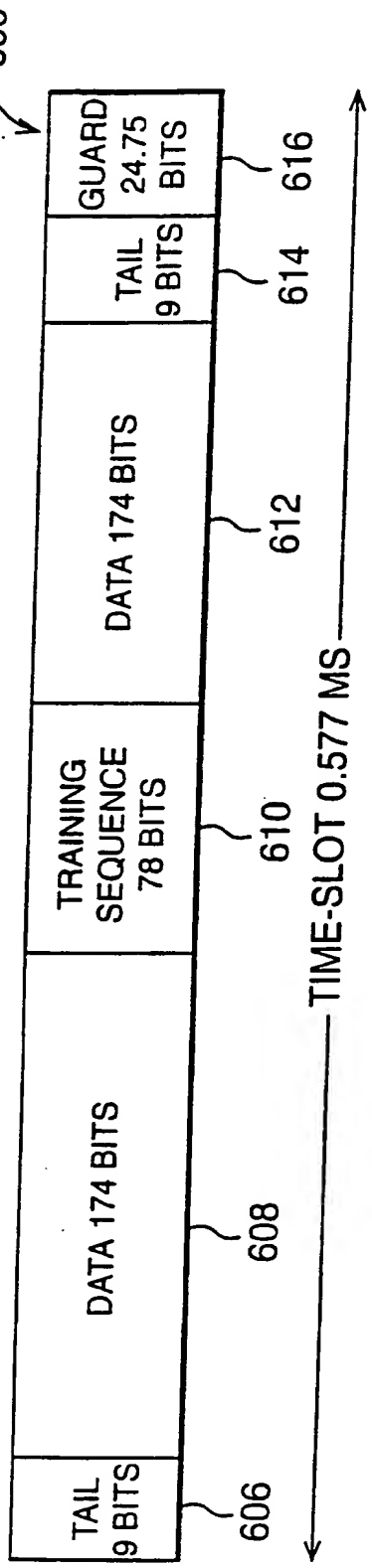


FIG. 21

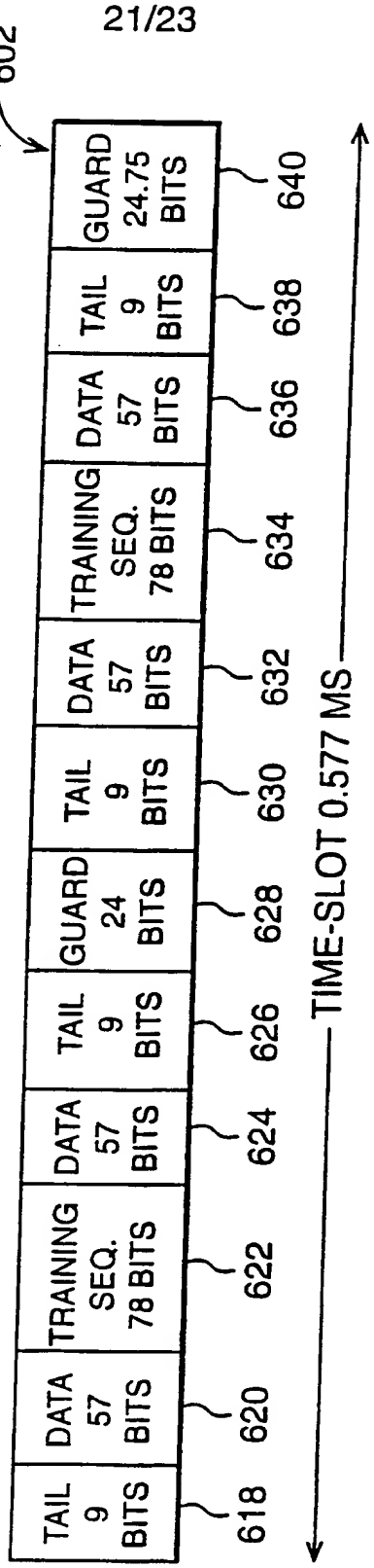


FIG. 22

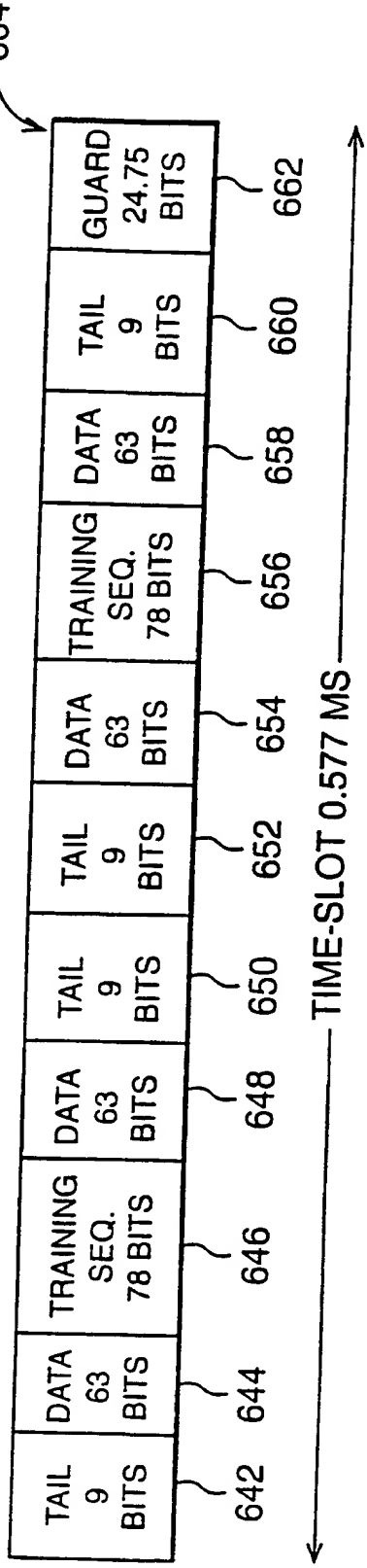
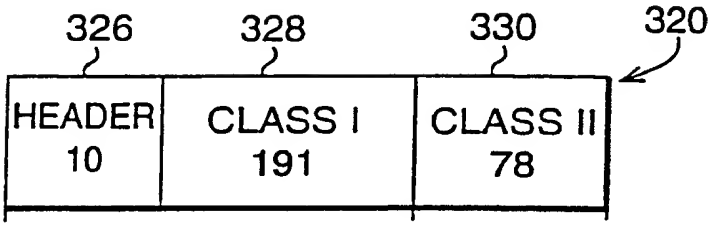


FIG. 24

FIG. 23(a)



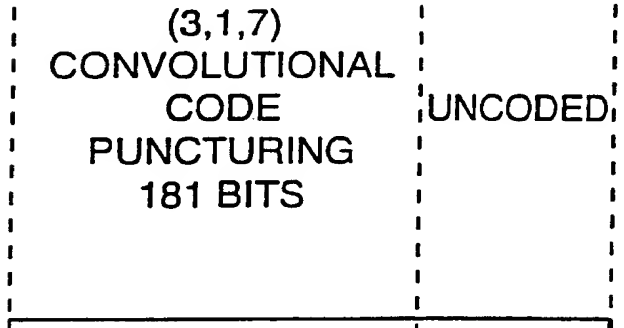


FIG. 23(b)

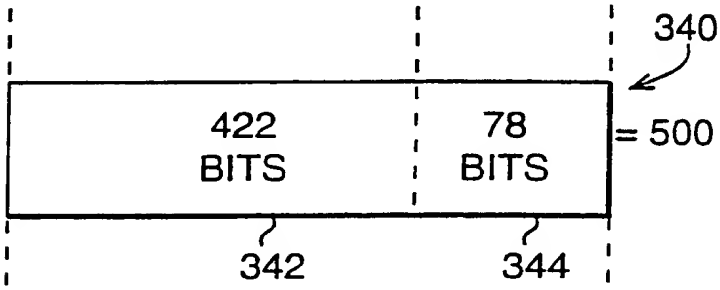


FIG. 23(c)

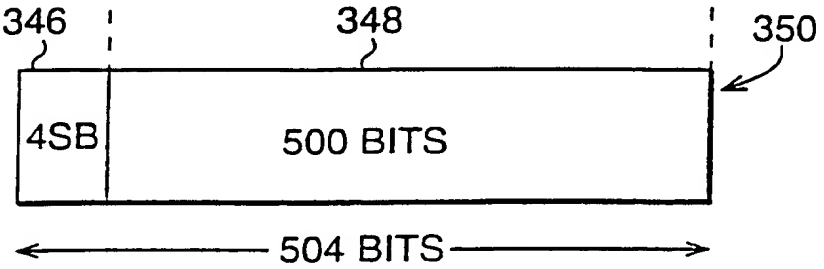
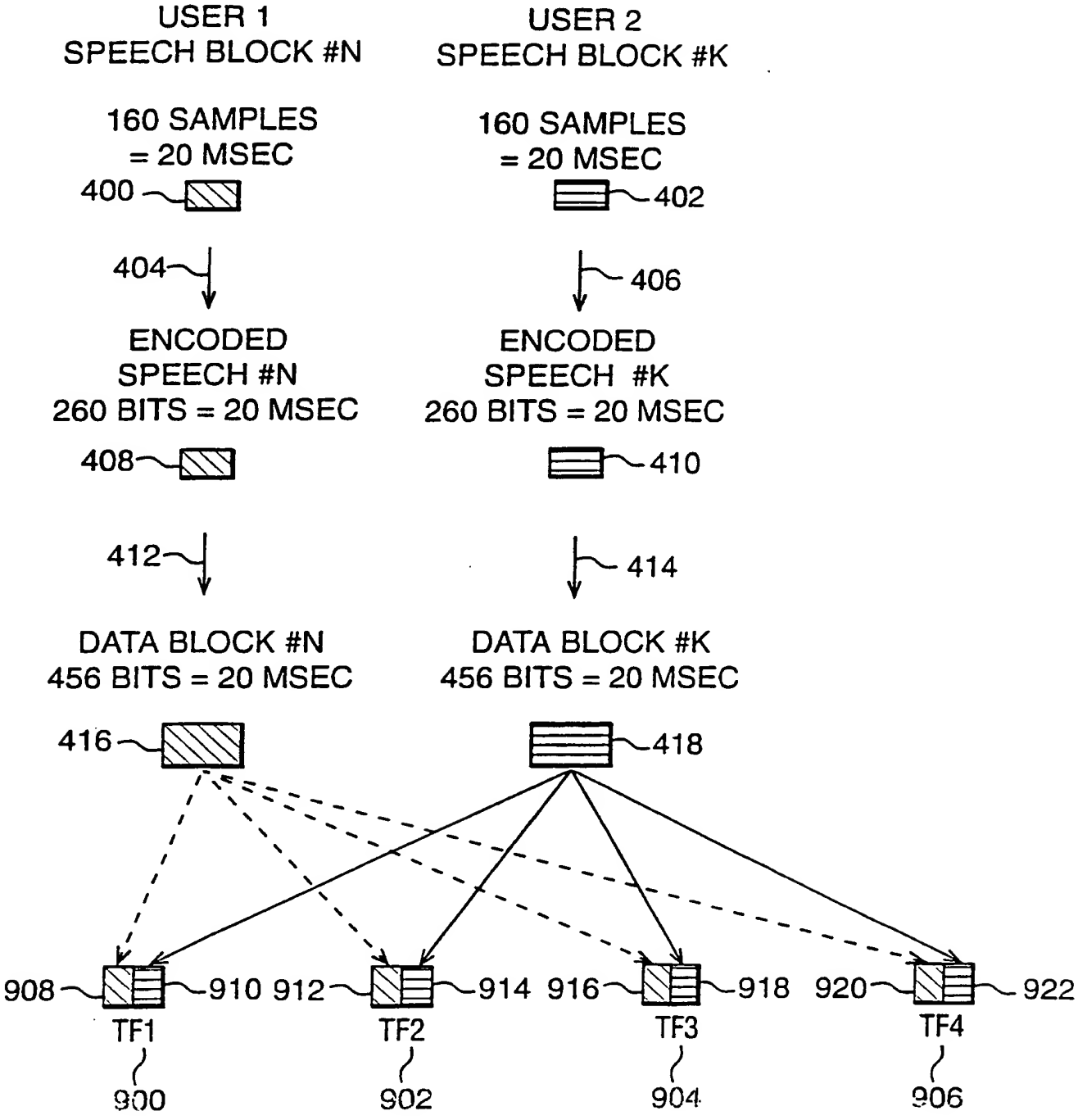


FIG. 25


USER 1
SPEECH BLOCK #N
160 SAMPLES
= 20 MSEC
400
404
ENCODED
SPEECH #N
260 BITS = 20 MSEC
408
412
DATA BLOCK #N
456 BITS = 20 MSEC
USER 2
SPEECH BLOCK #K
160 SAMPLES
= 20 MSEC
402
406
ENCODED
SPEECH #K
260 BITS = 20 MSEC
410
414
DATA BLOCK #K
456 BITS = 20 MSEC
416
418
908
910
912
914
916
918
920
922
TF1
TF2
TF3
TF4
900
902
904
906